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occupies more lines than the account of the bird, as with the savanna sparrow and purple martin. An amusing feature of the extensive bibliography is the translation of the titles of newspaper articles into intelligible form, for example,—*Linger in Winter's Lap*. (An account of birds which delayed their migration.)—*Birds of Mystery at Lake Forest*. (Notes on evening grosbeaks.)—The twelve half-tones of birds or bird haunts include a photograph of a colony of great blue herons, twenty miles north of Chicago.

F. T. L.

The Excess of Male Births.—In the May *Naturalist* (vol. 41, p. 303) A. H. Pike discussed the significance of the excess of male births in human offspring, extensive statistics indicating that 106 males are born for every 100 females. In the June issue of the *Proc. of the Cambridge Phil. Soc.* (vol. 14, p. 122) Walter Heape presents the best available statistics for dogs. Among 36,867 pups of registered stock there are 117 males for every 100 females. Of some twenty breeds considered, all showed an excess of males except two, the figures for which were based on limited returns. The excess of males is apparently greater in large breeds of dogs than in small ones. Mr. Heape believes that the *latest* moment at which sex of offspring can be determined is the time of fertilization. However, since nutrition of the parents may alter the sex-determining factors in their spermatozoa or ova, he thinks it possible that the sex of offspring may be controlled, at least to some extent.

F. T. L.

Recent Publications Concerning the Structure of Insects.—*The Wing Rudiments of the Sheep Tick*.—That the wings of the adult insect are present in the larva in the form of disk-like rudiments is a well known fact. Even wingless species, excepting the Thysanura, possess these so-called "imaginal disks" in the larvae, thus indicating descent from winged ancestors. Extending the work of Pratt, '00, Stange,¹ '07, has traced the development and the degeneration of the rudiments of the wings and halteres in the sheeptick, *Melophagus ovinus*.

He finds that in the earlier stages the disks of the wings and the halteres are identical in appearance except that from the first the

¹ Stange, P. Über die Rückbildung der Flügel und Halterenscheiben bei *Melophagus ovinus*. *Zool. Jahrb. Anat.*, 1907, 24, pp. 295-322. Pls. 27-28.

wing rudiments are the larger. The wings continue to develop until in the late pupal stages they are provided with a chitinous covering bearing bristles. They then degenerate so that there are left in the adult only peg-like vestiges well supplied with nerves, and possibly sensory in function. Previous workers have mistaken these structures for vestiges of the halteres. The latter, however, completely disappear and are replaced by a spiracle.

The Physiology of Metamorphosis.—An important contribution on the subject of the changes which initiate metamorphosis in insects is a brief article by Metalnikoff.¹ Utilizing the method of marking the leucocytes by means of carmine injections he was able to establish beyond question their active participation in the histolytic changes.

The most interesting feature of his work is the discovery that at the beginning of metamorphosis there appear in the blood of the larva specific toxins which apparently poison definite tissues and cells, and thus render them liable to the attacks of the phagocytes. Blood of mature larvae of *Galleria melonella* was injected into young larvae of the same species and led to almost immediate paralysis. For a half hour or longer, depending upon the quantity of blood injected, the subject lay as though dead, and then gradually recovered. Check experiments showed that injection of the blood of young individuals is perfectly innocuous. The toxicity of the blood is manifest two or three days before pupation and disappears about the third day of pupal life, as soon as the course of histolytic change is run, and the building up of new tissues is well under way.

Similar results were obtained from experiments on the silk-worm, but there is brought out the interesting fact that injections of blood of *Galleria* has no effect on *Bombyx* and *vice versa*.

Regeneration in Insects.—Przibram² has succeeded in the difficult task of rearing to maturity the common European Praying Mantis, and has studied their color variations and their power of regeneration.

He found that this species which in nature is usually green or brown in captivity produced solely brown nymphs and yellow imagos. The number of molts is seven or eight. The color may vary during the nymphal period but this is apparently independent of their surroundings, degree of moisture, or temperature.

¹ Metalnikoff, S. Zur Verwandlung der Insekten. *Biol. Centralbl.*, 1907, 27, pp. 396-405.

² Przibram, H. Aufzucht, Farbwechsel, und Regeneration unsrer europäischen Gottesanbeterin (*Mantis religiosa* L.). *Arch. f. Entwicklungsmechanik*, 1907, 23, pp. 600-614.

The grasping leg is capable of regeneration but on account of the great mortality among the nymphs this is seldom to be observed.

The same investigator, assisted by Werber,¹ has carried on a series of experiments on the power of regeneration in the bristle-tails (Lepismatidae) which on account of the generalized condition of this group are of especial significance.

The authors find that the Lepismatidae show a marked power of regeneration, since antennae, palpi, anal stylets, and legs may be replaced after mutilation. This capability was to be noted even in sexually mature individuals.

In molting, growth phenomena, and power of regeneration the forms studied display a generalized condition in keeping with their low systematic rank, and comparable to what has already been reported for the myriapods and crustaceans.

The Post-embryonic Development of the Mid-intestine in Trichoptera. — The changes undergone by the mid-intestinal epithelium of insects at the time of metamorphosis have been the subject of considerable study during recent years, but in a preliminary paper Russ² has brought to light some entirely new facts regarding epithelial replacement in the pupa of the caddice-fly, *Anabolia laevis*.

In the first day of the prepupal stage there begins an active division of the cells in the regenerative centers of the mid-intestine. The new cells extend out under the old larval epithelium which is soon entirely cast off and forms in the lumen of the intestine the so-called larval "yellow body." Meanwhile the new cells have completely clothed the intestine and now through their activity hasten the dissolution of the mass of old tissue.

Thus far the conditions are similar to what have been observed in other insects. The new epithelium, however, does not *in toto* become the definitive lining of the intestine of the adult. By a contraction of the muscles of the mid-intestine and a consequent formation of a ring-like thickening within its lumen its two ends are brought into proximity. The ring of epithelium and muscle is then constricted off, and now forms a second "yellow body" within the definitive mid-intestine which has been formed from only a small portion of the prepupal tissues.

¹ Przibram, H. und E. I. Werber. Regenerationsversuche allgemeinerer Bedeutung bei Borstenschwänzen (Lepismatidae) I. c. pp. 615-631.

² Russ, E. Über die postembryonale Entwicklung des Mitteldarmes bei den Trichopteren (*Anabolia laevis* Zett.) *Zool. Anz.*, 1907, 31, pp. 708-710.

The Suboesophageal Body of Insect Embryos.—The question as to the origin and the morphological significance of the suboesophageal body which has been found in certain insect embryos is an open one. Hirschler¹ has studied this structure in embryos of *Donacia* and has added much to our knowledge of its nature. He finds that it is entodermal in origin and that from an unpaired rudiment at the end of the stomadeal invagination there arise four rounded, paired masses which finally communicate directly with the lumen of the mid-intestine. These persist until at least the third day of larval life,—their further fate has not been studied.

Hirschler's results apparently confirm the theory of Nusbaum and Fulinski, '06, that the suboesophageal body is to be homologized with the hepatopancreas, or glandular diverticula of the mid-intestine, of the Crustacea.

W. A. RILEY.

Stridulation Rhythm of Crickets.—According to A. F. Shull (*Can. Ent.*, vol. 39, p. 213), in the chirping of the snowy cricket "exact synchronism is comparatively rare" and exists only between two or three neighboring individuals. Thus two crickets five feet apart were observed to time their chirps in unison as if they heard each other. The rate of stridulation is independent of wing length; in general it increases with rise in temperature, but Dolbear's and Bessey's formulae to express this relation are only approximately correct. Under the same conditions the rate in different individuals varied from 93 to 110 chirps per minute. Except on cool nights, from 600 to 800 chirps are usually performed continuously; one cricket was found to chirp 2,640 times without interruption.

Notes.—Bull. 110 of the N. Y. State Museum, preparatory to a monograph of the Cecidomyiidae, presents descriptions of 203 new species belonging to this group. The Cecidomyiidae, or gall gnats, are dipterous insects from 0.5 to 3.0 mm. in length which produce various leafy galls including the "willow cones." Bull. 109 of the N. Y. State Museum is devoted to the tussock moth and elm leaf beetle, presenting a colored plate of each, and six photographs showing their destructive effects. The gypsy moth and brown tail have not yet invaded New York.

¹ Hirschler, J. Über leberartige Mitteldarmdrüsen und ihre embryonale Entwicklung bei *Donacia*. *Zool. Anz.*, 1907, 31, pp. 766-770.